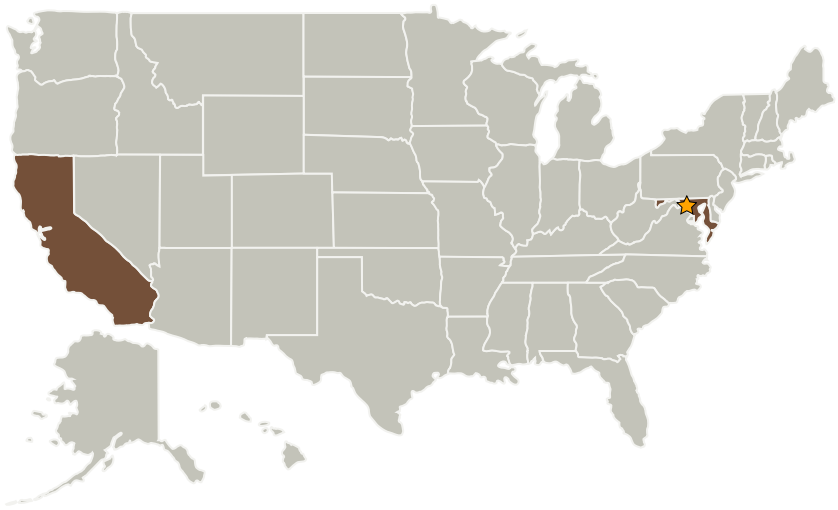
An Alternative Millimeter Wave Oscillator using a Dielectric Puck in the Whispering Gallery Mode, Phase I

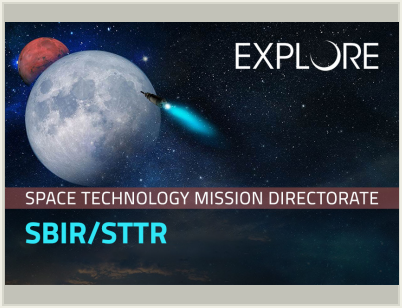
Completed Technology Project (2006 - 2006)

Project Introduction

A majority of millimeter wave based systems used for space exploration, communications and research, require a millimeter wave oscillator. These oscillators have been typically based on the Gunn Diode. Due to reliability issues and high DC power requirements, they are prone to failures. These failures could result in an unsuccessful space mission, a life-threatening situation and/or loss of invaluable data. An alternative to this technology is highly desirable. MMW Design Services is proposing to develop an alternative oscillator to the Gunn Diode using a Dielectric Puck operating in the Whispering Gallery Mode. This innovation has the potential to produce compact, low noise oscillators operating with a frequency from 20GHZ to 120GHz. Traditional Dielectric Resonating Oscillators operating in a fundamental mode are limited to 30GHz. A Whispering Gallery Mode DRO uses a similar puck but in a much higher order mode, thus extending the resonant frequency. The significance of this innovation is the improved performance of the oscillation at millimeter wave frequencies. Space exploration will reach new heights. Satellites will operate longer and more efficiently resulting in cost effective missions that extends beyond our current mission life capability.

Primary U.S. Work Locations and Key Partners





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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Goddard Space Flight Center (GSFC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Goddard Space Flight Center(GSFC)	Lead Organization	NASA Center	Greenbelt, Maryland
MMW Technology, Inc.	Supporting Organization	Industry	lawndale, California

Primary U.S. Work Locations	
California	Maryland

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX05 Communications, Navigation, and Orbital Debris Tracking and Characterization Systems
  - TX05.4 Network Provided Position, Navigation, and Timing
    - TX05.4.1 Timekeeping and Time Distribution